



Foam extinguishing systems

*Cool down.
Fire Protection by*

MINIMAX

FOAM

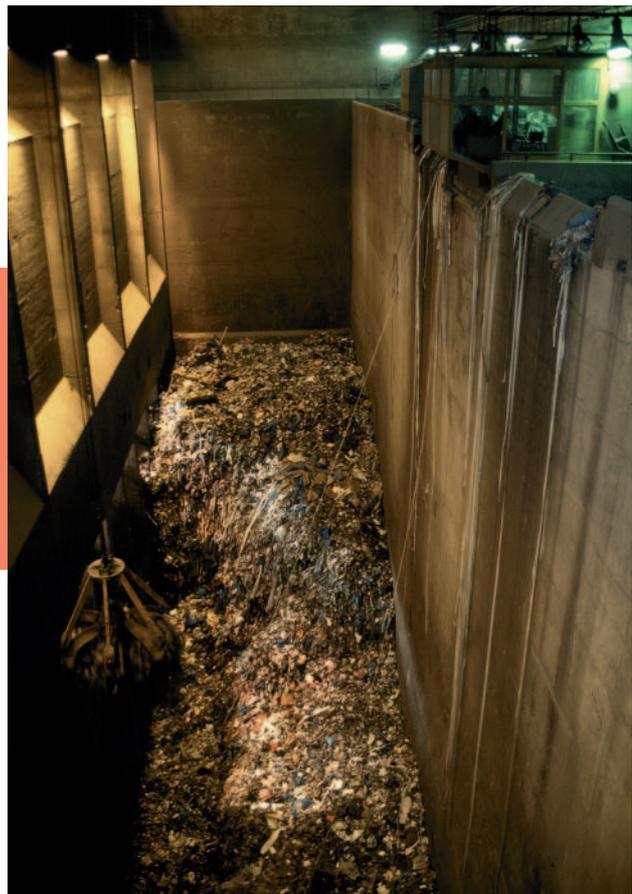
versatile

Storage facilities, incineration plants, refineries or plastics/tyre depots have one thing in common: they pose a special risk. When flammable liquids or plastics catch fire, the fire spreads very quickly and toxic combustion gases are emitted. This results in damages that cost millions as well as environmental pollution.

Foam extinguishing systems are the most effective fire protection for this risk area, particularly in the fire categories A and B. In case of fire, foam maker, foam monitors, sprinklers or nozzles are used, depending on the area of application, in order to disperse the foam over large areas. This ensures that the fire can be fought quickly, safely and in an environmentally friendly manner.

Unlike water, foam is lighter than combustion materials such as oil or petrol. The extinguishing foam is a highly effective fire extinguishing agent consisting of water, fire extinguishing foam and air. The amount of air determines the type of foam and changes its properties. With small to extremely high foaming options, optimum extinguishing action is achieved for each risk. Extinguishing foam uses various extinguishing effects and changing properties: cooling, suppressing, separating, covering, insulating and displacing, all of which prevent further outbreak of the fire.

With a versatile foaming agent range, Minimax offers safe and flexible application. Perfectly aligned components are supplied in line with the individual needs of clients and according to respective fire protection requirements.



PRODUCT

flexible components

Foam sprinklers and nozzles

Minimax specialises in stainless steel nozzles for low expansion foam extinguishing systems. As an exclusive manufacturer, Minimax supplies sprinklers for the production of low expansion foam. Sprinklers are generally used in storage areas. Nozzles are best suited for the protection of filling stations and filling tank vehicles or for protecting objects, as with hydraulic units or as indoor protection in drum stores.



Foam maker/foam chamber/foam pourer

These three co-ordinated components comprise the specially designed "TankFoam RTK" kit for protecting flammable liquids in fixed roof tanks. It is used to generate low expansion foam, for which all common foaming agent concentrates can be used.



Foam monitor

The foam monitor is for external use, to fight fires from a safe distance and to preventatively cool objects at risk of catching fire. Depending on the version the monitor can be aligned with the target manually, electrically or hydraulically by remote control.



High expansion foam generator

Generators produce high expansion foam, which is used to protect storage areas. Foam floods the entire room and deprives the fire of oxygen by displacing air somewhat like a carbon dioxide extinguishing systems.



DirectAlarm foam

These components make alarm testing easy. Weekly tests are carried out with water from the pump distributor before the proportioner. A foam/water mix does not have to be discharged and disposed of.



Foaming agent concentrate

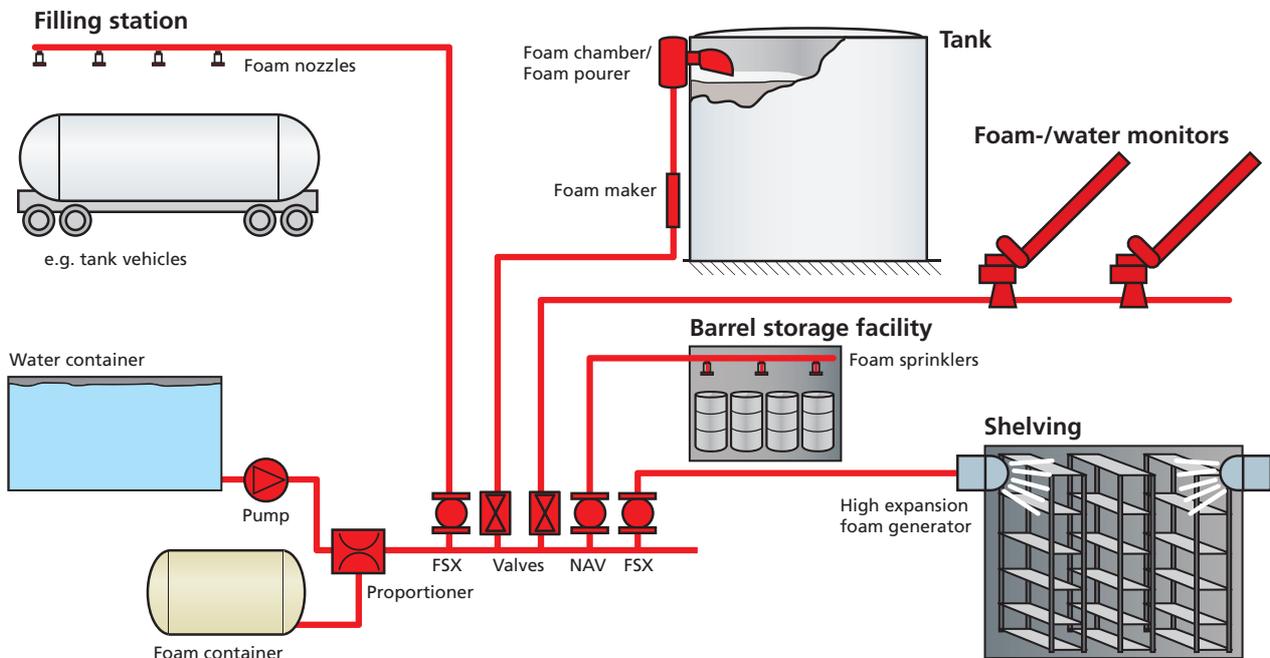
The foaming agent range includes a large number of protein and synthetic foaming agents. Foaming agents are available for all solid, liquid and alcohol/solvent fires.

FUNCTION

simply effective

To generate foam, a proportionally constant quantity of foaming agent is added to the water flow using a mixing device. The water/foaming agent mix created is frothed up with

air in successive foam generators and then applied to the burning object using the dispersion method best suited to the risk type.

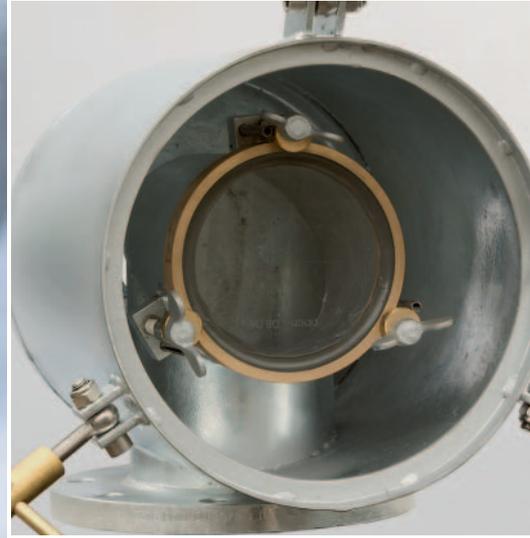


Areas of application:

- Refineries/fuel depots
- Waste incineration plants
- Aeroplane maintenance hangars
- Storage racks with high plastics content
- The chemical industry
- Offshore and ships
- Coal silos
- Tyre depots

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TankFoam RTK

Foam maker – Foam chamber – Foam pourer

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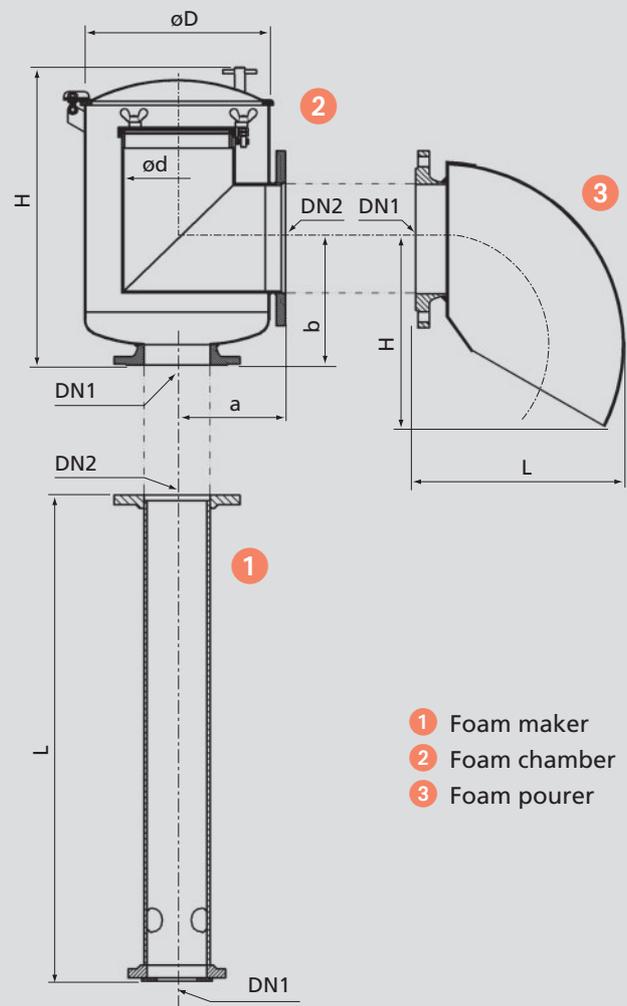
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► Product ► Application + Advantages

- ▶ MX TankFoam RTK is a kit consisting of the following co-ordinated components: foam pipe, foam chamber and foam pourer. This system kit produces low expansion foam and is specially designed as fire protection for flammable liquids in fixed roof tanks (including those with floating cover or overlay of nitrogen).
- ▶ In case of fire, TankFoam RTK dispenses the low expansion foam from above onto the burning surface of the liquid. The extinguishing foam is dispersed from the inner wall of the tank. The foam smothers the flames preventing further reignition.
- ▶ All common foaming agent concentrates can be used. Special designs with particular materials can also be supplied.
- ▶ The foam chamber rupture disc corresponds to EN 13565-1 and enables gas-tight connection of the extinguishing system to the tank.
- ▶ The rupture disc is secured with a highly durable 2-part adhesive. A rupture disc seal with higher chemical resistance can be delivered on request.
- ▶ The distance between the foam maker and the foam chamber can be up to 3 m vertically or 20 m horizontally.
- ▶ The special design of the foam maker facilitates use of the low expansion foam over greater heights.
- ▶ Standard kit designs are hot-galvanised or galvanised with Minimax red coating. Stainless steel can be supplied on request.
- ▶ Flanges are supplied in accordance with DIN and ANSI standards.
- + Design in accordance with EN 13565-1.
- + Short maintenance times through very easy access to rupture disc in the foam chamber.
- + Modular structure allows components to be arranged freely.
- + Can be supplied in various materials and with various surfaces, meaning that it can be used with all media and in all environmental conditions.
- + The rupture disc does not need to be dismantled for function tests. No danger of water or foam leaking into the tank.
- + Series with large flow rate range.
- + The flange size allows components to be combined without error.
- + Grids on openings prevent blockages caused by animals, e.g. bird's nests.

Function

- ▶ The TankFoam RTK components are aligned with each other. Cross sections become larger in the direction of flow, helping to improve the foam quality after it is produced in the foam maker.
- ▶ The pressurised foam/water jet suctions through the foam maker apertures, causing low expansion foam to be produced through the strong swirling action.
- ▶ The foam is homogenised in the piping to the foam chamber and undergoes a further qualitative improvement when it is spun in the foam chamber. The foam pressure causes the rupture disc to burst, thus releasing the foam into the tank.
- ▶ The foam pourer directs the foam spray to the inner wall of the tank. The foam flowing down the wall extends out from one point over the burning surface of the liquid.
- ▶ The rupture disc in the foam chamber prevents the flammable gas from leaving the tank. No explosive gas is present in the foam system piping.
- ▶ Safe functioning of the foam discharge devices is guaranteed by observing the narrow threshold values of EN 13565-1.



- 1 Foam maker
- 2 Foam chamber
- 3 Foam pourer

Technical data

TankFoam RTK Kits				
Individual components				
	1 Foam maker	2 Foam chamber	3 Foam pourer	Q [l/min] at 5 bar
TankFoam RTK 200	MX-L2st	MX-STO4s	MX-SK 125	200
TankFoam RTK 400	MX-L4st	MX-STO4s	MX-SK 125	400
TankFoam RTK 800	MX-L8st	MX-STO8s	MX-SK 150	800
TankFoam RTK 1200	MX-L12st	MX-STO16s	MX-SK 250	1200
TankFoam RTK 1600	MX-L16st	MX-STO16s	MX-SK 250	1600
TankFoam RTK 2000	MX-L20st	MX-STO32s	MX-SK 300	2000
TankFoam RTK 2400	MX-L24st	MX-STO32s	MX-SK 300	2400
TankFoam RTK 3200	MX-L32st	MX-STO32s	MX-SK 300	3200

Individual components	Type	D1	D2	L DIN / ANSI	H	a	b
1 Foam maker	MX-L2st	50	80	705			
	MX-L4st	50	80	705			
	MX-L8st	80	100	1005 / 1027			
	MX-L12st	100	150	1103			
	MX-L16st	100	150	1103			
	MX-L20st	100	200	1103			
	MX-L24st	125	200	1103			
	MX-L32st	125	200	1103			
2 Foam chamber	MX-STO4s	80	125		500	200	215
	MX-STO8s	100	150		570	200	215
	MX-STO16s	150	250		680	300	290
	MX-STO32s	200	300		710	300	335
3 Foam pourer	MX-SK 125	125		265 / 299	231		
	MX-SK 150	150		350 / 384	231		
	MX-SK 250	250		473 / 507	426		
	MX-SK 300	300		473 / 519	426		

Flange connections accord. to DIN 2501 PN10 or ANSI B16,5 class 150

Surfaces: hot-galvanised DIN EN ISO 1461-tZn o or hot-galvanised + red Minimax similar to RAL 3000

Subject to technical modification.

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Extinguishing foam concentrate

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FOAM CONCENTRATE

Fire-extinguishing foam is a highly effective extinguishing media for fires of fire class A and B. The foam concentrates are supplied to the water flow by admixing devices in a proportionally constant quantity. This generated mixture is foamed with air in subsequent foam discharge devices. The foaming characteristics depend on the type of foam concentrate, the respective discharge devices and the supplied air volume.

Wet low expansion foam is produced at a low air induction. More air content make the foam drier to produce medium or high expansion foam.

Foam uses various extinguishing effects: Cooling, suppressing, separating, covering, insulating and displacing – each effect alone or in conjunction with others provides quick success in extinguishing.

Minimax offers the right foam concentrate for every event of fire: Protein foam concentrates are used to produce low expansion foam, synthetic foam concentrates can be used to produce low expansion, medium expansion and high expansion foam, film-forming AFFF foam concentrates with the additional suitability for extinguishing systems with low expansion rate e.g. sprinkler systems as well as alcohol-resistant foam concentrates.

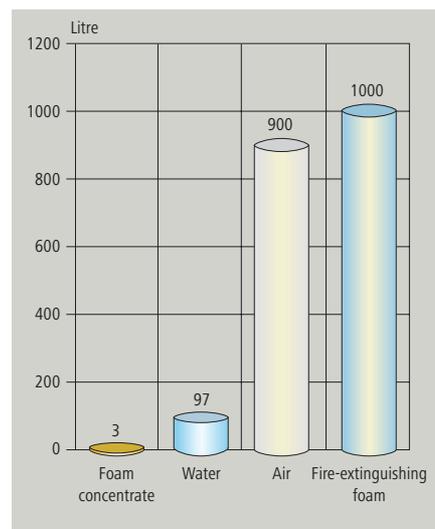
The selection of the foam concentrate is based on the fire situation and special ambient conditions at the location of the fire. It is decisive for

the extinguishing success that the fire is covered quickly and with a sufficiently high and closed foam layer so that the extinguishing effects of the foam can develop in its entirety immediately.

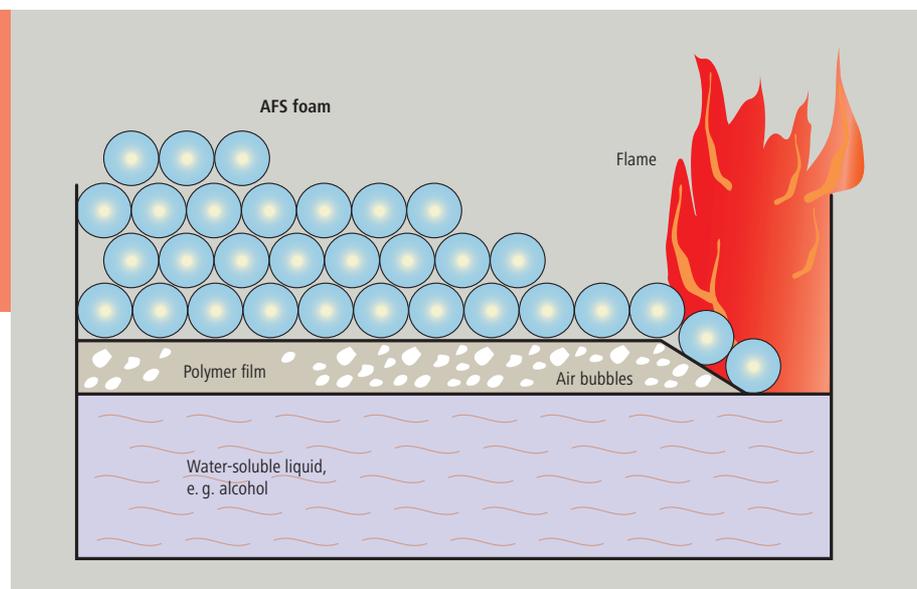
Foam concentrate criteria

Foam expansion rate

The foam expansion rates are listed in the valid standards. It describes the volume of the fire extinguishing foam at a ratio to the volume of the water-foam mixture used. Example: If 10 litres of low expansion foam are produced from 1 litre of water-foam mixture, the foam expansion rate is 10.



Expansion rate 1:10



Principle drawing: polymer film development

CHARACTERISTICS

Sea water resistance

This important requirement for the use on ships, in seaports and offshore areas is fulfilled by most foam concentrates. The resistance also applies for the foam generation with purified industrial water, river and brackish water.

Flowability and adhesive power

A quick foam expansion is guaranteed at an excellent flowability. The excellent adhesive power on also steep projecting objects guarantees that the insulating and cooling effect of the foam can act as long as possible.

Aqueous film formation

A very thin, quick flowing tenside film develops on the burning surface when using aqueous film forming foam concentrates, which serves the fire-extinguishing foam a sliding surface and guarantees an especially quick foam flow. In addition, the tenside film also prevents re-ignition and therefore also protects the surface of a combustible fluid, which is not completely covered by the foam.

Aqueous film forming foam concentrates marked with the addition „AFFF“.

Polymer film formation

Foam concentrates with polymer film forming elements create an insulating protective layer between the foam cover and alcohol-containing, foam-destroying liquids (such as ethanol, isopropanol, methanol).

A foaming application which is gently or not directly aimed to the fire is required for the development of a continuous polymer film.

Mixing of foam concentrates

Foam concentrates of various types and origins may never be mixed together.

Compatibility

Fire-extinguishing foams generated from different concentrates can be used simultaneously in the event of a fire. The combined extinguishing use with foam-compatible extinguishing powder is also possible.

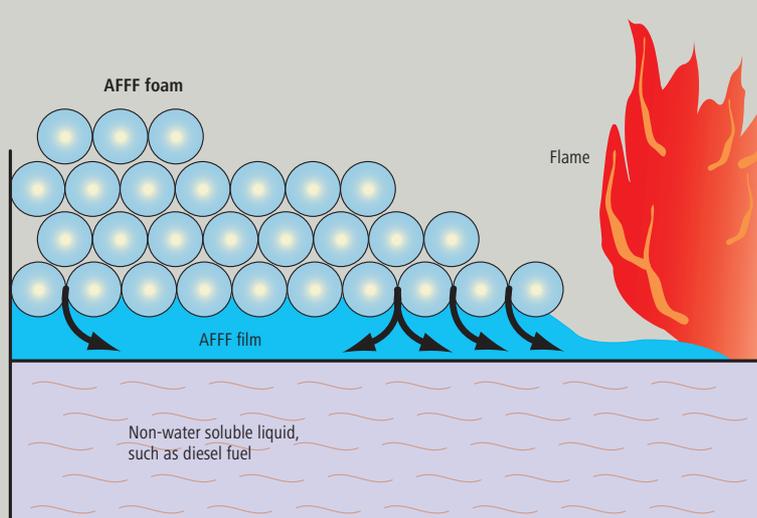
Frost resistance

Foam concentrates should only be used within the scope of the specified application temperatures. Temporary freezing and thawing does not have any negative effect on the quality of the foam concentrate.

Storage

Foam concentrates can be stored for many years in suitable containers.

Based on the contents, the concentrates are assigned to Water Hazard Classifications. The resulting regulations must be observed (e.g. VAWS). Storage equipment for foaming concentrates must be installed and maintained by an authorized company under certain conditions according to the local law.



Principle drawing: Water film development (AFFF effect)

Equipment and systems	Main applications	Foaming concentrate
Foam branch pipes, foam/water monitor, foam fire-fighting systems	Protein foam concentrate for producing low expansion foam – against fires of non-foam destroying hydrocarbons and solids Key points of use: Chemical and petrochemical industry, on ships and airports PROMAX SPECIAL is also suitable for preventive runway foaming.	PROMAX STANDARD PROMAX SPECIAL PROMAX SPECIAL F-30
Foam branch pipes, foam/water monitor, foam fire-fighting systems, sub-surface systems (not for water-miscible fluids)	Protein foam concentrate to produce low expansion foam – against fires of non-polar hydrocarbons, hydrocarbon fires with low shares of polar materials and solids fires Key points of use: Chemical and petrochemical industry, on ships and in airports	FLUOR PROMAX 3% FLUOR PROMAX FFFP 3%
Low expansion foam branch pipes, foam/water monitor, low expansion foam systems, foam generators, medium expansion foam systems, high expansion foam generators, high expansion foam systems	Synthetic foam concentrate for producing low, medium and high expansion foam (all kind of expansion rates) – against fires of non-polar hydrocarbons and solids Key points of use: Chemical and petrochemical industry, on ships and airports High expansion foam is mainly used for total flooding (also for displacing explosive gas/air mixtures)	EXTENSID -6/ -15/-20 EXTENSID K1%
CAFS extinguishing systems		EXTENSID CLASS A
Sprinkler systems, foam/water monitor, low expansion foam, foam fire-fighting systems, foam sprinklers/nozzles	Synthetic foam concentrate to produce low expansion foam – against fires of non-polar hydrocarbons, solids fires (can also be used without foaming) EXTENSID AFFF 1% f-15 and EXTENSID AFFF f-15 are AFFF foaming agents, which are also suitable to produce medium expansion foam. Key points of use: Chemical and petrochemical industry, on airports and in the offshore area, plastics fires, sprinkler systems	EXTENSID AFFF 1% f-15 EXTENSID AFFF N EXTENSID AFFF f-15
Low/medium expansion foam branch pipes, foam/water monitor, foam fire-fighting systems, foam sprinkler, foam pourer, sub-surface systems (not for water-miscible fluids)	Synthetic foam concentrate for producing low expansion foam – and medium expansion foam – against fires of very foam-destroying, polar and non-polar hydrocarbons Key points of use: Chemical and petrochemical industry, pharmaceutical industry, paint industry and in the offshore area EXTENSID AFS LV is suitable for the use in sprinkler systems.	EXTENSID AFS 3/3 EXTENSID AFS 3%
Foam sprinklers/nozzles, low/medium expansion foam branch pipes, low expansion foam nozzles		EXTENSID AFS f-15 EXTENSID AFS LV

Foaming concentrate	Chemical characterisation	Special properties
PROMAX STANDARD	Hydrolysed proteins, foam stabilisers and antifreeze	Quick flowing, well adhering, stable and gasproof, flame- and heat-resistant, prevents re-ignition, powder-compatible
PROMAX SPECIAL		
PROMAX SPECIAL F-30		
FLUOR PROMAX 3%	Hydrolysed proteins, foam stabilisers, with fluorine tenside additives and antifreeze	Quick flowing, well adhering, stable and gasproof, flame- and heat-resistant, oil-deflecting, powder-compatible, prevents re-ignition
FLUOR PROMAX FFFP 3%		Quick flowing, water film forming, well adhering, stable and gasproof, flame- and heat-resistant, oil-deflecting, powder-compatible, prevents re-ignition
EXTENSID -6/ -15/-20	On a synthetic base, with foam stabilisers and antifreeze	Fluid, stable and gasproof, flame- and heat-resistant, powder-compatible, prevents re-ignition, excellent wetting agent
EXTENSID K1%		
EXTENSID CLASS A		
EXTENSID AFFF 1% f-15	On a synthetic base, with fluorine components and antifreeze	Very quick flowing, water film forming, stable and gasproof, flame- and heat-resistant, oil-deflecting, powder-compatible, prevents re-ignition
EXTENSID AFFF N		
EXTENSID AFFF f-15		
EXTENSID AFS 3/3	On a synthetic base, with fluorine components and polymer film developers and antifreeze	Quick flowing, polymer and/or water film forming, stable and gasproof, flame- and heat-resistant, oil-deflecting, powder-compatible, alcohol-resistant, prevents re-ignition
EXTENSID AFS 3%		
EXTENSID AFS f-15		
EXTENSID AFS LV		

Foaming concentrate	Proportioning rate	Foam expansion rate	Specific weight (kg/dm ³)	Frost resistance up to
PROMAX STANDARD	6%	6 to 8 times relative to the equipment type, water pressure and proportioning	1.15 ± 0.02	-15 °C
PROMAX SPECIAL	3%		1.18 ± 0.02	
PROMAX SPECIAL F-30	3%			-30 °C
FLUOR PROMAX 3%	3%		1.16 ± 0.02	-15 °C
FLUOR PROMAX FFFP 3%	3%			
EXTENSID -6/ -15/-20	Low expansion foam 3% Medium expansion foam 3% High expansion foam 2-3% Wetting agent 0.5-1%	Low expansion foam up to 20 times Medium expansion foam up to 200 times High expansion foam more than 200 times relative to the equipment type, water pressure and proportioning	1.02 ± 0.02	-06 °C -15 °C -20 °C
EXTENSID K1%	Low expansion foam 1% Medium expansion foam 1% High expansion foam 1% Wetting agent 0.5%		1.04 ± 0.02	-15 °C
EXTENSID CLASS A				
EXTENSID AFFF 1% f-15	1%		Low expansion foam up to 7 times Medium expansion foam up to 75 times relative to the equipment type and water pressure	1.08 ± 0.02
EXTENSID AFFF N	3%	6 to 8 times relative to the equipment type and water pressure	1.15 ± 0.02	
EXTENSID AFFF f-15	3%	Low expansion foam up to 10 times Medium expansion foam up to 100 times relative to the equipment type and water pressure	1.05 ± 0.02	
EXTENSID AFS 3/3	3% for hydrocarbon fires; 3% for fires with polar and/or very foam destroying chemicals			
EXTENSID AFS 3%				6 to 8 times relative to the equipment type and water pressure
EXTENSID AFS f-15	3% for hydrocarbon fires; 5% for fires of polar and/or very foam destroying chemicals	Low expansion foam up to 10 times Medium expansion foam up to 100 times relative to the equipment type and water pressure	1.06 ± 0.02	-15 °C
EXTENSID AFS LV	3% for hydrocarbon fires; 3% for fires of polar and/or very foam destroying chemicals		1.11 ± 0.02	

EFFECTS

The various extinguishing effects, which individually or together with others guarantee a quick and sustainable extinguishing success react when using fire-extinguishing foam.

Cooling effect

This effect specifically comes to fruition in fluid and solids fires, which have extremely high temperatures at the burning surface. Based on the heat effect, the water proportion in the foam evaporates very quickly, whereby the combustion energy is removed from the burnt material.

Spreading effect

When using aqueous film forming foam concentrates (AFFF), a very thin and especially slippery tenside film separates. This rushes ahead of the foam and therefore provides it with excellent flowing and extinguishing properties.

Displacement effect

Due to the use of medium and high expansion foam in closed or spatially divided fire sections, oxygen is removed from the fire zone, while existing combustible gases are simultaneously displaced.

Separating effect

The closed foam cover causes the fire zone to separate the surrounding air and shielding it from outside against any further oxygen supply.

Smothering effects

The dense foam cover smothers the fire by preventing the oxygen supply to the burnt material.

Insulating effect

The low heat conductivity of the foam insulates extinguished materials and objects or those that have not been affected by the fire, so that they are secured against heat effects and ignition sources.

Cover effect

The closed foam cover covers the gas emissions of combustible materials so that they cannot reach the fire zone. The burnt material is cooled at the same time and the vapour pressure is reduced, whereby gas breakthroughs and potential re-ignitions are prevented. The risk of a fire outbreak can be clearly reduced and the polluting emissions can be reduced by preventive foaming for liquid, lightly gassing products.

APPLICATION

Low expansion foam

is produced by foaming a water-foam mixture 4 to 20 fold with air. Depending on the application, protein foam concentrate, synthetic foam concentrate or AFFF will be used. Normally, low expansion foam is used 6 to 10 fold foamed.

Extinguishing effects:

- ▶ Separating effect
- ▶ Cooling effect
- ▶ Film forming effect
(AFFF and AFS concentrates)

Range of application

Low expansion foam is used against burning liquids, such as gasoline, benzol, alcohol, oils, paints, solvents, when storing and manufacturing plastics as well as in recycling facilities. Great throwing ranges can be achieved with low expansion foam, as required in firefighting on tankers, in fuel storage depots and in aircraft collisions, due to its great specific weight.

Medium expansion foam

is produced by foaming a water-foam mixture 20 to 200 fold with air. Synthetic foam concentrate will be used. Generally, medium expansion foam is applied 40 to 150 fold foamed.

Extinguishing effects:

- ▶ Separating effect
- ▶ Cooling effect
- ▶ Displacement effect

Range of application

Medium expansion foam is especially suited for firefighting at ground level, for example, in catchment areas for combustible fluids.

High expansion foam

Is created by foaming a mixture of water and foam concentrate with air to more than 200 times the original volume. The material used is a synthetic foam concentrate. With the aid of high expansion foam generators can generate foam with a foam volume increased by up to 1000 times.

Extinguishing effects:

- ▶ Separating effect
- ▶ Insulating effect
- ▶ Displacement effect

Range of application

The main application field of high expansion foam is in the flooding of rooms affected or at risk of fire. Especially production or storage buildings can be effectively protected by this method.

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